

CLAIMS

1. A control device of a multicylinder internal combustion engine provided with a valve operating characteristic control means for controlling a valve operating characteristic of at least one of an intake valve and an exhaust valve, which estimates an intake difference of cylinders and limits a control range of the valve operating characteristic in accordance with the estimated intake difference.
2. A control device of a multicylinder internal combustion engine as set forth in claim 1, which limits said control range of the valve operating characteristic considering the engine speed and valve operating characteristic at the time of estimation of the intake difference in addition to the estimated intake difference.
3. A control device of a multicylinder internal combustion engine as set forth in claim 1 or 2, which controls an operating angle as said valve operating characteristic and sets a lower limit of control range of the operating angle larger the larger the operating angle at the time of estimating the intake difference.
4. A control device of a multicylinder internal combustion engine as set forth in claim 1 or 2, which controls a valve lift as said valve operating characteristic and sets a lower limit of control range of the valve lift larger the larger the valve lift at the time of estimating the intake difference.
5. A control device of a multicylinder internal combustion engine as set forth in claim 1 or 2, which controls an operating angle and/or valve lift as said valve operating characteristic and sets a lower limit of control range of the operating angle and/or valve lift larger the larger the intake difference estimated.
6. A control device of a multicylinder internal combustion engine as set forth in claim 1 or 2, which controls an operating angle and/or valve lift as said

valve operating characteristic, limits a control range of the valve operating characteristic by correcting a target operating angle and/or target valve lift to become larger by exactly a predetermined correction amount when
5 controlling the operating angle and/or valve lift, and sets said correction amount to become smaller the larger the target operating angle and/or target valve lift before correction.

7. A control device of a multicylinder internal
10 combustion engine as set forth in claim 6, wherein said correction amount is set so as to become larger the larger the estimated intake difference.

8. A control device of a multicylinder internal
15 combustion engine as set forth in claim 1 or 2, which device is further provided with an operating timing changing means for changing an operating timing of at least one of the intake valve and exhaust valve, controls an operating angle and/or valve lift as said valve
20 valve operating characteristic, limits a control range of the operating angle and/or target valve lift to become larger by exactly a predetermined correction amount when controlling the operating angle and/or valve lift, and changes the operating timing of at least one of the
25 intake valve and exhaust valve so that a length of a period in which the intake valve and exhaust valve are both open in the case of the target operating angle and/or target valve lift after correction approaches or matches a length of a period in which the intake valve
30 and exhaust valve are both open in the case of the target operating angle and/or target valve lift before correction.

9. A control device of a multicylinder internal
35 combustion engine as set forth in claim 8, which changes the operating timing of at least one of the intake valve and exhaust valve so that a timing of a period in which the intake valve and exhaust valve are both open in the

case of the target operating angle and/or target valve lift after correction approaches or matches a timing of a period in which the intake valve and exhaust valve are both open in the case of the target operating angle and/or target valve lift before correction.

5 10. A control device of a multicylinder internal combustion engine as set forth in claim 1 or 2, which device is further provided with an operating timing changing means for changing an operating timing of at
10 least one of the intake valve and exhaust valve, controls an operating angle and/or valve lift as said valve operating characteristic, limits a control range of the valve operating characteristic by correcting a target
15 operating angle and/or target valve lift to become larger by exactly a predetermined correction amount when
controlling the operating angle and/or valve lift, and changes the operating timing of at least one of the
intake valve and exhaust valve so that a length of a
20 period in which the intake valve and exhaust valve are both open in the case of the target operating angle
and/or target valve lift after correction becomes shorter than a length of a period in which the intake valve and
exhaust valve are both open in the case of the target
operating angle and/or target valve lift before
25 correction.

 11. A control device of a multicylinder internal combustion engine as set forth in claim 10, wherein an
extent of shortening the length of the period where the
intake valve and exhaust valve are both open is set in
30 accordance with a magnitude of change of intake pressure required for control of the intake due to correcting said
target operating angle and/or target valve lift to
control said operating angle and/or valve lift.

 12. A control device of a multicylinder internal
35 combustion engine as set forth in claim 1 or 2, wherein the intake difference of cylinders is estimated based on
the intake detected by an intake detecting means provided

- 45 -

at an upstream side from an intake passage branching to
an individual cylinder and wherein the intake detecting
means detects the intake at the time of a valve operating
characteristic by which the timings of opening of the
5 intake valves of the plurality of cylinders do not
overlap.

13. A control device of a multicylinder internal
combustion engine as set forth in claim 12, wherein said
intake detecting means includes an intake pressure
10 sensor.